

CLAIMS

1. Material for neutron shielding and for maintaining sub-criticality comprising a matrix based on a vinylester resin, at least one polyamide and an inorganic filler  
5 capable of slowing and absorbing neutrons.

2. Material according to claim 1, in which the polyamide is an aliphatic polyamide.

3. Material according to claim 2, in which the polyamide is chosen from among 11 polyamides,  
10 12 polyamides, 6-12 polyamides and mixes of them.

4. Material according to claim 1, in which the vinylester resin is chosen from the group composed of bisphenol A-type epoxyacrylate and epoxymethacrylate resins, novolac-type epoxyacrylate and methacrylate resins,  
15 epoxyacrylate and epoxymethacrylate resins based on halogenated bisphenol A and resins obtained from an isophthalic polyester and an urethane.

5. Material according to claim 3, in which the vinylester resin is a novolac-type epoxyacrylate or  
20 epoxymethacrylate resin.

6. Material according to claim 1, in which the inorganic filler capable of slowing and absorbing neutrons comprises at least one hydrogenated inorganic compound and at least one inorganic boron compound.

7. Material according to claim 6, in which the hydrogenated inorganic compound is chosen from the group composed of alumina hydrates and magnesium hydroxide.

5 8. Material according to claim 6, in which the inorganic boron compound is chosen from the group composed of boric acid, colemanite, zinc borates, boron carbide, boron nitride and boron oxide.

10 9. Material according to claim 6, in which the hydrogenated inorganic compound is alumina hydrate with formula  $\text{Al}_2\text{O}_3$ .

10. Material according to claim 6, in which the inorganic boron compound is zinc borate with formula  $\text{Zn}_2\text{O}_{14.5}\text{H}_7\text{B}_6$  or boron carbide.

15 11. Material according to claim 6, with an atomic concentration of hydrogen between about  $4.5 \times 10^{22}$  and  $6.5 \times 10^{22}$  at/cm<sup>3</sup>.

12. Material according to claim 6, with an atomic concentration of boron between about  $8 \times 10^{20}$  and  $3 \times 10^{21}$  at/cm<sup>3</sup>.

20 13. Material according to claim 1, in which the vinylester resin accounts for between 30 and 45% of the total mass of this resin, the polyamide and inorganic filler being capable of slowing and absorbing neutrons.

25 14. Material according to claim 13, in which the polyamide accounts for between 10 to 30% of the total mass

of the vinylester resin, the polyamide and inorganic filler being capable of slowing and absorbing neutrons.

15. Material according to claim 1, with a density of between 1.3 and 1.6.

5        16. Process for preparation of a material for neutron shielding and for maintaining sub-criticality comprising a matrix based on a vinylester resin, at least one polyamide and an inorganic filler capable of slowing and absorbing neutrons, including the following steps:

- 10        • mix the vinylester resin, the polyamide, the inorganic filler capable of slowing and absorbing neutrons, with at least one resin polymerization accelerator,
- 15        • add at least one resin polymerization catalyst to this mix,
- degas the mix under a vacuum,
- pour the mix obtained into a mould, and
- allow it to set in the mould.

17. Process according to claim 16, in which the mould  
20 is composed of a compartment of a packaging for transport, interim storage and/or ultimate storage of radioactive products.

18. Packaging for transport, interim storage and/or ultimate storage of radioactive materials, comprising at  
25 least one shield formed from the material as defined in any one of claims 1 to 15.